1. Numbers
2. Counting
3. Assembling numbers
4. Writing numbers and symbols
5. Place values
6. Counting times tables
7. Times tables
8. Factors
9. Addition
10. Subtraction
11. Multiplication
12. Division
13. Fractions
14. Calculating in your head
15. Least common multiple
16. Greatest common divisor

2.2 - Geometry

The topics of this area were considered to introduce geometry to students who intend to continue their studies by creating a basic vocabulary in the host language and, where required, an understanding of the units of measure in the host country.

1. Plane geometry
2. Perimeters and areas
3. Solid geometry
4. The Cartesian plane
5. Expressing definitions and theorems
6. Sexagesimal system
7. Units of measurement

2.3 - Literal calculation

This topic was considered specifically for those who intend to obtain school qualifications in the host country and must, therefore, integrate literal calculation into their educational path to arrive at first order equations. As we shall see below, the lessons in this area are easily adaptable to other topics of literal calculation.

1. Representing monomials and polynomials
2. Operations between monomials
3. Equations

3. Guidelines

3.1 - Who is the target?

This result of the project is geared for teachers and educators who are engaged in mathematics literacy for foreigners.

The activities described address specific mathematics topics and can be applied as they are described in the manual or adapted to the needs of the class.

The guidelines don't describe the activities necessary for building a group or managing and empowering group dynamics within a theatre workshop setting. This type of expertise can only be transferred to teachers through ad hoc training. For those who do not have any type of theatre experience and want to better understand how theatre workshops function, refer to §II.3, above.

Where possible, it is recommended that teachers without experience in conducting theatre workshops have the support of an expert from the field. In considering cases where this is not possible, a dual use of the didactic materials was considered.

The work sheets can be used employing alternative approaches according to the experience and expertise of the teachers.

Teachers with theatre training and previous experience in conducting Social and Community Theatre workshops can use the TELL ME project work sheets included in §III.4 within a more articulated workshop process that foresees an initial phase for building the group and conveying basic theatre skills. In the case of teachers who are experts in conducting Social and Community Theatre workshops, it is possible to consciously work with the participants on life skills, which respond to the needs identified in §III.1, while teaching maths.

For teachers with no experience in conducting theatre workshops and who cannot count on the assistance of an expert, it is in any case

possible to use the TELL ME project work sheets (§III.4) as activities in and of themselves as long as they are carried out while paying attention to certain methodological aspects described below.

3.2 - Related methodology

The activities for maths literacy developed for the TELL ME project are based on the Social and Community Theatre methodology and, in particular, on the "Mathemart - teaching Math in theatre workshops" method arriving at a set of activities that respond to the needs of foreign adult students and their teachers. Moreover, the structure of some activities and lessons borrowed from the experience acquired during the Grundtvig "MATheatre - Performing and Playing in Adult Mathematical Literacy" workshop for adults.

Before going into the details of the TELL ME work model, we will briefly introduce the related methodology that we started from.

The Social and Community Theatre methodology is applied within educational, social and cultural contexts.

«It is a practice put in place by professionals (a team) with multiple skills (theatre, psychosocial, etc.) in partnerships involving people, groups, communities in relation to their specific identity, and promotes empowerment through performance activities which use different languages, creative processes and forms of performance, its aim is change (political and care dimension) and the creation of artistic symbols and shared meanings (aesthetic and cultural dimension).»[2].

The definition of "Social and Community Theatre" was introduced at the beginning of the 2000s at the University of Turin by the team led by Alessandro Pontremoli and Alessandra Rossi Ghiglione.

Over the past 15 years, through the work of the Social and Community Theatre Centre of Turin, SCT has worked in diverse areas: from schools to prisons, from mental health centres to rest homes, hospitals, businesses and suburbs to international projects for development cooperation and welcoming migrants. The SCT methodology is recognised as a best practice for culture, welfare and health in Europe today.

2 - Rossi Ghiglione A. (2013). *Teatro sociale e di comunità*. Rome: Dino Audino Editore.

The methodology consists of diverse approaches and work phases in which techniques and languages vary according to the abilities of the experts involved. In all cases, however, the process with the group/community has a final performance as its result, which can be of various natures: barters, parades, shows, festivals, etc.

The work process fine-tuned in the TELL ME project doesn't reach the performance phase geared toward a public outside the group, as foreseen in the SCT approach. In this case, attention was paid to the SCT model of the theatre workshop, which was used and adapted to meet the requirements that emerged in the needs assessment phase of the TELL ME project.

«Since the 1960s, workshops have become the normal method through which theatre groups conduct research and create, and pedagogues and instructors structure learning paths for theatre professionals. The theatre workshop, as we have witnessed, is one of the possible routes that is used in social theatre.»[3].

Theatre workshops have a very precise structure, which define them in space, time and the relations between participants and actions. They are normally made up of a series of scheduled encounters in which a group of people, led by an expert, meet in a space dedicated to carrying out activities based on one or more agreed-upon themes or objectives during the beginning of the actual workshop. They are usually used when the intention is to work with a group in which a certain distance from the dynamics of daily life can be created.

The work space is usually an empty room or at least as empty of superfluous furniture and objects as possible, and of the appropriate dimension to contain a group and isolate it from the outside world.

The length of each theatre workshop meeting is articulated according to timing *«very similar to the phases of a rite of passage. There is a separation phase, a border phase and a reintegration phase.»*[4].

The separation phase is useful to enter into a separate dimension from that of daily life. Normally this other dimension is fostered by an empty space prepared especially to welcome the work group and by a series of actions and rituals, which promote a psychological attitude aimed at the here and now within the group.

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3 - Rossi Ghiglione A. and Pagliarino A. (2007) *Fare Teatro Sociale*. Rome: Dino Audino Editore.

4 - Bernardi C. (2004). *Il teatro sociale*. Rome: Carocci editore.

The border is the one in which *«people free of the bonds of daily life (social roles, codes of conduct, laws, etc.) explore the world, its modus operandi and symbols in a playful way.»*[5]. It is the phase in which work is conducted on the mind-heart-body awareness of individuals through psychophysical training, and through group exercises, the formation of a group and an awareness of relationships is developed.

Finally, in the border phase, we also arrive at scene exploration and creation based on themes that are central to the group and which reflect the reason they have been put together.

The reintegration phase consists of a feedback and closing phase which normally involves a formalised ritual within which participants say goodbye to each other and gradually re-enter ordinary life.

Social theatre workshops structured in this way require the presence of one or more trainers. They have the skills both on a theatre level as well as a socio-training one, and have the task of guiding the activities according to the methodology described previously.

The expert that leads the theatre workshop has specific training which allows her/him to recognise and facilitate the processes which are in play on various levels (cognitive, relational and emotional) in a group workshop.

Mathemart, based on the theatre workshop, is an innovative approach to mathematics created by Maurizio Bertolini in 2011, which consists in supporting maths teaching using the SCT methodology. Increasingly, teachers are searching for new teaching methodologies for mathematics and Mathemart was conceived as a new way to become familiar with maths in theatre workshops; in an effort to get around the fear and difficulties that the subject can generate. The Social and Community Theatre methodology is used to immerse oneself in the game of maths through active involvement and is an approach that involves the mind and body, as well as the innate creativity of each of us.

The theatre workshop setting fosters an atmosphere of trust, creativity and play, allowing students to freely explore the activities proposed without judgment, and encourages learning from one's own endeavours through a sequence of trials and errors.

If a student is intimidated by mathematics he/she does not feel free

5 - Rossi Ghiglione A. e Pagliarino A. (2007). *Fare Teatro Sociale*, Rome: Dino Audino Editore.

to make mistakes. The fear blocks the student's capacity for logical thinking thus hindering the ability to think correctly. But this does not mean that he/she is incapable of doing so. A positive theatre setting can help forget fears and promote appreciating the possibility of learning through play and interaction with classmates. In fact, in the Mathemart workshops, mathematics is not discussed but experienced by playing with the rules and relations of maths.

Mathemart was tested in primary and middle schools in Italy starting in 2011 with positive results. Nonetheless, when the research group began working on the TELL ME method, Mathemart had not been tested on migrants. For this reason, the Mathemart exercises and approaches were used as a starting point to then be adapted and developed according to the needs described in §III.1.

In the same way, the Grundtvig "MATheatre - Performing and Playing in Adult Mathematical Literacy" seminar, conducted with a group made up of maths teachers and artists, identified a series of options for working with adults, which are different from the ones adopted with children, especially in terms of the manner in which activities are proposed. Once again, it was about rough indicators that had never been tested on adult migrants thus, as in the case of Mathmart, the information was used as a starting point to begin the research process.

3.3 - The TELL ME methodology

The field of application that TELL ME must respond to is very vast and heterogeneous. Each class may contain, as was ascertained in the needs analysis, types of people and educational needs that are very different from one another.

It is therefore impossible to define a distinct path that may be adapted to any group of student migrants, structured in a fixed number of lessons with each one addressing a precise topic in a pre-defined order.

The proposed exercises cannot entirely substitute the classroom lesson but were conceived of as a tool that can interact with the frontal lesson and fill in gaps that groups of adult migrants may have in certain classroom learning situations.

What the research team decided to do, based on previous experiences

and the results of activities carried out over the two years of the project, was to create a "tool box", didactic materials, which can be used at the discretion of the teacher depending on the particular group he/she is working with.

The didactic materials may be used following different logics and we have identified some of them.

The work sheets were created according to three categories, arithmetic, geometry and literal calculation.

In the first one, we find all the topics that help to recognise and know how to write numbers, the four basic operations and then arriving at topics that are more arduous such as fractions, least common multiple and greatest common divisor, which may be useful for those hoping for an educational qualification in the host country.

In the second category, geometry, we inserted basic activities that can be used to introduce or enhance many specific topics: from representing geometric forms to calculating the areas of plane figures up to expressing definitions and theorems of three-dimensional figures. In this section activities were inserted that were not actually geometry such as for example "Units of measure". In the third section, literal calculation, three activities are evident which allow us to explore monomials and polynomials, the fundamentals of literal calculation, standard identities and first order equations.

In addition, we developed differentiated learning paths according to the diverse categories of the subjects involved and present some of these paths as follows.

Learning Path 1 - *Linear usage*

The exercises were placed in a particular order within each category that assured the preceding ones were preparatory to those that followed. Thus, a first approach is to propose the sequence of exercises to the group as they are presented in the manual. This progression can be useful in a homogenous class with whom the intention is to do a global overview of the programme proposed or a session of one of them.

Learning Path 2 - *Basic literacy*

This path was intended for those who do not have maths literacy, even

in their language of origin, and thus need to start with the basics, that is recognise and know how to write numbers, understand the place value of a digit and do the four basic operations.
For this path we recommend the following sequence of activities.
Arithmetic - activities 1, 2, 3, 4, 5, 9, 10, 11 and 12.
Geometry - activities 17, 18 and 23.

Learning Path 3 - *Translating previous knowledge*
This path is intended for those who have good maths literacy in their language of origin and need to translate the basic concepts already learned into the host language.
For this path we recommend the following sequence of activities.
Arithmetic - activities 1, 2, 6, 7, 8, 9, 10, 11, 12 and 13.
Geometry - activities 17, 19, 20 and 23.

Learning Path 4 - *Mathematics in daily life*
This path is intended for those who need to learn the basic useful skills of everyday life but do not wish to obtain educational qualifications in the host country.
For this path we recommend the following sequence of activities.
Arithmetic - activities 1, 2, 6, 7, 8, 9, 10, 11, 12, 13 and 14.
Geometry - activities 17, 22 and 23.

Learning Path 5 - *Educational qualifications*
This path is intended for those who intend to obtain an educational qualification in the host country. It is a process that provides the basics of the three trajectories for more in-depth study. We imagine this aimed at people who had minimal mathematics skills in their language of origin.
For this path we recommend the following sequence of activities.
Arithmetic - activities 1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16.
Geometry - activities 17, 18, 19, 20, 21, 22 and 23.
Literal calculation - activities 24, 25 and 26.

Each activity is intended for one or more specific topics. In the case of some activities, variations are also indicated and in general the activi-

ties described can be easily adapted and used to work on topics that are different from those indicated.

How the main activity should be inserted into the work plan for the class, is up to the teacher because it can depend on many factors and a general rule cannot be applied. First of all, it is important to take into account the characteristics of the group: the composition, the level of literacy, and attitude toward non-frontal and theatre activities. Moreover, the choice must keep in mind the teacher's expertise in leading groups in a non-frontal setting, her/his theatre skills as well as social theatre ones. For teachers who don't have a great deal of experience in leading theatre workshops, we recommend trying the methodology starting from simpler exercises to learn how to manage the group while doing. A fluid and confident management of the group fosters the climate necessary for the successful realisation of the activities both in terms of content and relationships.

The combination of these variables renders each situation unique. As an example, we describe the structure of the lessons that we used in April 2018 to test the methodology in Sweden with a group made up of women and men from Syria, Eritrea, Kosovo, Afghanistan and Philippines.

The structure used, which lasted about two hours, is the following.

1. Introduction.
2. Opening up and warm up useful for the main activity.
3. Main activity.
4. Revisiting mathematical tools.
5. Conclusions.

The introduction is useful for welcoming the group into the relevant space and explaining the day's proceedings, in terms of timing and the types of activities that will be carried out, to the participants.

The second phase is very important because it prepares the group for carrying out the main activity. During this phase, the group is asked to get started, both physically and mentally, in order to be prepared for what will happen next. Normally, exercises that are preparatory to those that will follow are done. For example, if the main activity requires the use of objects and their transformation into something extraordinary, exercises that develop creativity and the use of objects will be proposed during the warm up phase.

The main activity consists of the maths topic that the teacher intends to address and is proposed only when he/she considers the group has acquired the necessary theatre skills to proceed without worrying about the performance component. A clear signal that the theatre element has been internalised, is evident when the trainer's proposals are carried out without embarrassment or hesitation, on the contrary, participants immerse themselves in the activity, allowing themselves to be transported into theatre play. The performance moment sustains the mathematics component rendering it playful and fun.

At the end of the main activity, we move to a more analytical phase in which, with the help of the group, we discuss the maths topic addressed. It is further analysed in an in depth manner and formalised on the flipchart so that the shift from the theatre activity to the abstract concept necessary to understand the topic is clear to everyone.

Fig. 3. - An example of a work sheet for students.

Finally, the activity is concluded with a formal moment for saying goodbye which functions as the closure of the work session just completed.

Moreover, a work sheet was created for each activity destined for the students. The sheet serves as a reminder of the work done and can be used by the teacher at the end of the lesson to review what was done previously and also evaluate how much the student has learned.

Each work sheet is on an A4-sized sheet of paper and can be downloaded as a pdf at:
https://elearning.tellmeproject.com
and **https://social.tellmeproject.com/download**.
It is divided into three sections as seen in Figure 3.

In the first square at the top, is a vignette that represents the activity

being carried out which serves to link the experience lived to the content that will be listed below.

Space is left in the middle part so the student can write the title of the activity and the key words linked to the main topic in order to establish a minimum of useful vocabulary related to the topic being addressed. For example, if the title of the activity is "Fractions", the key words connected to it that could emerge during the lesson are: numerator, denominator, simplification, reduction, etc...

The last square at the bottom is left empty and may be used at the teacher's discretion for students to do a useful brief maths problem to verify whether the topic has been learned at the end of the lesson. Referring back to the fraction example, the assignment given could be: *«Draw three cakes. Each cake is made up of 12 slices. Colour the quantity that corresponds to 1/2 in the first cake, 1/3 in the second and 5/12 in the third»*.

3.4 - Work principles

What the work team did was to highlight an approach that can be used with any class group, both with teachers who have theatre skills and those who do not.

With the aim of guaranteeing the high quality of the activities proposed, we believe it is important to stress a series of issues that the trainer must take into account, whether he/she is an expert of theatre workshops or not. We have articulated the following series of principles that are applicable even to those who decide to use the TELL ME activities without employing a theatre workshop approach.

Progression from theatre to mathematics

It is essential that participants feel comfortable using the theatre language proposed in the maths and theatre activities. In order for students to concentrate on the mathematics side of the activity, it is important that the theatre language be acquired and a source of fun instead of stress or embarrassment, as could be the case with a shy person or someone unused to theatre.

To meet this requirement, which can be considered a starting point for introducing mathematics into the activity, it is recommended that the first meetings be predominantly just theatre activities aimed at acquiring a common theatre language. Only subsequently, when the the-

atre foundation is more structured, can the maths activity component be added. To understand the typology of the progression, we can refer to the example of the theatre workshop process described in §II.3.

Absence of judgement

It is crucial that the entire process be lived by the participants in a manner which allows them to fully explore what is being proposed by the trainer. The activities should never be judged in terms of right or wrong, but be presented as experiences to live together from which we can learn; also and most importantly from our own mistakes. One factor linked to the absence of judgment is the importance of not instilling competition between students. When we begin to play with the maths concepts, it is very easy to slip into contests between participants. It is up to the trainer to maintain a playful milieu and, even if the game in itself may have a competitive component, to tone down the moments that could be sources of comparison between participants in terms of right/wrong or better/worse.

Playing

Playing is one of the foundations of theatre which allows participants to easily access a dimension that is outside the daily one.

Playing is transcultural: from what we were able to observe during the TELL ME workshops, a playful environment and attitude, and an equally playful trainer, become compelling regardless of cultural origins.

Starting and stopping a game is easier than starting and stopping a more structured theatre activity so creating a climate of trust in the initial work phase with the group is recommended to allow for subsequently moving toward the action of theatre.

«From this point of view it [play] contributes exactly because of its mysterious qualities and the fact that it evades any definition, being part of theatre workshops, which are almost like a sort of neutral place, an 'already but not yet', a decompression room, allows for a gradual passage and painless experience from the reality often lived on painful or conflicting terms by the subjects involved in socio-educational theatre, to the new adventure of group theatre.» [6].

6 - Pontremoli A. (2005). *Teorie e tecniche del teatro educativo e sociale*. Turin: Utet Libreria.

Play, done seriously like children know how to do, requires very deep involvement which helps participants forget everything else and remain in the here and now. In this sense, playing with mathematics has proved to be very important in allowing participants who are afraid to make mistakes forget their fear and thus has fostered effective training in putting the brakes on inhibitions.

4. Didactic Materials

4.1 - Premise

The didactic materials presented in this chapter were structured in the form of work sheets each of which presents an activity linked to a maths topic from the curriculum developed by the project team. Each work sheet for the teacher has a matching one for the students.

As the TELL ME methodology is based on the use of theatre workshops, each sheet describes how the activity should be carried out giving hints to the teacher/educator so they may be used with the appropriate attention described in the previous chapter, even without particular expertise in theatre.

Each work sheet is broken down into a series of categories which allow for a complete description:

- Key words
- Purpose
- Pre-requisites
- Didactic materials
- Description
- Duration
- Variations
- Observations

4.2 - Arithmetic

NUMBERS

Keywords - Counting.

Purpose - Training participants in the use of numbers in the local language, familiarising them with games and numbers.
Description - The group stands in a circle. The trainer begins the game which consists of throwing an imaginary ball. Before throwing it, the participant must establish eye contact with the classmate he/she wants to throw it to. Once eye contact has been established, the ball is thrown by clapping hands horizontally in the direction of the classmate that will receive it. During the throw we count, starting from the first throw, from 1 to 10 and then backwards from 10 to 1. Every time a mistake is made, the group starts at 1 again. The game ends when participants are able to count from 1 to 10 and back again without making mistakes.
Duration - A minimum of 10 minutes depending on the variations.
Variations - Instead of the numbers 5 and 10 the person says their name. Instead of numbers 3 and 7 the person says a type of fruit.

Another possible variation is using the timetables of the numbers 2 or 3, etc., instead of multiples of 1. All of these variations can be combined to make the game more complicated as the group acquires more knowledge.

COUNTING

Keywords - Counting.
Purpose - Training participants in the use of numbers in the local language, practicing counting.
Description - The group is arranged in a circle. Participants start walking on the spot stomping their feet following a rhythm indicated by the instructor. The trainer starts the game counting 1 to the first step, the person to the right of the trainer will count number 2 on the next step (or on every second one) and so on until we return to the trainer whom at that point will say in a loud voice the number N+1 where N represents the number of people in the circle. Once we have reached N+1 the counting continues starting back at 1 but said by the person who in the last round was number 2 and so on. You can do many rounds without interrupting the game. In each new round the person who starts at 1 is the one who said number 2 in the previous round. If a mistake is made the group starts at 1 again.

Once the basic mechanism is understood the group moves to the next phase. In the second phase the structure of the game is the same, walking on the spot at the same beat and counting numbers with every step (or every two steps) but the participants only say the numbers 1 and N+1 out loud. Once they have understood this new way of proceeding they arrive at the final step in which only the number 1 is said out loud moving to the participant to the right of where the previous round had begun.
Duration - A minimum of 10 minutes depending on the variations.
Observations - It is critical that each participant feels at ease walking on the spot and maintaining a common rhythm stomping their feet.

ASSEMBLING NUMBERS

Keywords - Numbers, presenting numbers, counting.
Purpose - Familiarising with numbers, learning numbers in another language.
Pre-requisites - Knowing numbers, knowing how to count.
Didactic materials - Various objects used on a daily basis, music.
Description - The trainer delineates a work space which is referred to as a raft. The trainer places some objects that are used daily inside the defined space: pillows, workbooks, pens, chairs.
The participants walk within the perimeter of the raft trying to remain evenly distributed within the space.
The trainer can guide the participants verbally with a stop and go or with a percussion instrument or piece of music: when the music is playing participants walk, when the music stops the trainer says a number "N" and the participants have to form subgroups of N people by hugging each other. Some participants may not be able to form a group of N people because their classmates are already occupied. In this case, they must try to reach the number N by substituting the missing people with the objects that are in the space.
E.g. - When the trainer stops the music or says "stop" and then "number 8", the participants have to create small groups consisting of 8 elements of either people or objects.
Duration - A minimum of 20 minutes.
Variations - When the music stops, the trainer can ask participants to

form subgroups according to the results of a math calculation.
E.g: «Form sub-groups of (30/15) x 3 people.».

WRITING NUMBERS AND SYMBOLS

Keywords - Numbers and symbols.
Purpose - Learning to recognise the forms of numbers and math symbols.
Pre-requisites - Knowing how to count from 0 to 10 in the local language.
Description - The trainer will illustrate the numbers and symbols that will be used on a flipchart or blackboard and will write the corresponding name for each symbol or number.
The group is divided into subgroups of N people depending on how many symbols will be used.

Each subgroup has 10 minutes to figure out how to portray a sequence of N numbers/symbols with their bodies in a way that each participant represents a number or symbol with his/her own body.

At the end of the process, each subgroup shows their classmates their sequence and the audience group will have to guess what it represents out loud.
E.g: 5+3-2 is made up of five symbols so it will be portrayed by 5 participants.
Duration - About 30 minutes.
Variations - The sequence can be rendered very theatrical by suggesting the participants select a soundtrack, or a type of walk to come on stage, or even by placing it in a representative setting (e.g. Ancient Egyptians, actions films, etc.).

In a group with good synergy and where physical contact isn't taboo, each symbol can be represented by more than one person in contact with each other.
Observations - For the activity to work it is important to define theatre elements very well: the stage, the audience, where the actors enter, in what order and the beginning and the end of the "performance".

PLACE VALUES

Key words - Place values.
Purpose - Understanding the place values of numbers.
Pre-requisites - Knowing how to count from 0 to 10 in the local language.
Description - The trainer delineates a space that will be used as a stage. Using masking tape or something similar, the width of the stage is divided into four equal parts which represent ones, tens, hundreds and thousands respectively.

Participants are given 5 minutes to figure out how to portray a concrete action individually without talking (e.g. eating, digging ...) in 4 different ways, from very small to very large.

Afterward, every participant will demonstrate their action on the stage starting from the ones area, moving to the tens, hundreds and thousands. Each passage calls for the action to get bigger than the preceding one. The action can be enlarged through movements, intensity, effects, etc., while trying to illustrate the amplification that takes place moving from one area to another on the stage as much as possible.
Duration - About 30 minutes.
Observations - This activity works very well if the group has a certain familiarity with the theatre dimension and the participants have already overcome the embarrassment of exhibiting themselves in front of their classmates.

COUNTING TIMES TABLES

Keywords - Counting, times tables.
Purpose - Training participants to do the times tables in the local language.
Pre-requisites - Knowing numbers in the local language, being able to do the "Counting" game with ease.
Description - The group is arranged in a circle. The trainer states which times table the group has to do. For this description we will take the example of the 3 times table. Exactly like the "Counting" activity, the participants walk on the spot with a common rhythm maintaining the beat with their feet. The trainer explains that the group will be doing the 3 times table.

The trainer starts the game saying 1 out loud to the beat of the steps,

the person to the right of the trainer will count, inside their head, 2 to the next step and so on until the group reaches 30. Participants will only say the numbers that are multiples of 3 out loud while the other numbers will be counted silently. It is essential that the numbers that don't belong to the times table selected are not said out loud. If a mistake is made the group starts at 1 again.
Duration - A minimum of 10 minutes depending on the variations.
Variations - Once the mechanism has been understood the group may continue going beyond the tenth multiplier (30 in our example) and the game stops solely when a participant makes a mistake.

TIMES TABLES

Keywords - Times tables.
Purpose - Training participants to break down numbers into prime factors.
Pre-requisites - Knowing how to count from 0 to 10 in the local language.
Description - The trainer delineates a work space which is referred to as a raft. The participants walk within the perimeter of the raft trying to remain evenly distributed within the space. The trainer can guide the participants verbally with a stop and go or with a percussion instrument or piece of music: when the music is playing they walk, when it stops they remain immobile. During the stops, the trainer will ask participants to portray statues that represent objects, people, abstract concepts, etc.

Once participants have understood the raft and transformation mechanism, the next phase can begin: the N participants are assigned a number from 1 to N which will be theirs for the duration of the activity.

The raft game continues and now at the stop the trainer only asks the participants whose number reflects the rule being applied to transform themselves.
E.g: «Only multiples of 3 transform»
«Only numbers that can be divided by 2 and 3 transform», etc.
Duration - A minimum of 10 minutes depending on the variations.

DIVISOR

Keywords - Divisor.
Purpose - Training participants to break down numbers into prime factors.
Description - The trainer delineates a work space which is referred to as a raft. The participants walk within the perimeter of the raft trying to remain evenly distributed within the space. The trainer can guide the participants verbally with a stop and go or with a percussion instrument or piece of music: when the music is playing they walk, when it stops they remain immobile. During the stops, the trainer will ask participants to portray statues that represent objects, people, abstract concepts, etc.

When participants have understood the raft and transformation mechanism, the next phase can begin: the N participants are assigned a number from 1 to N which will be theirs for the duration of the activity.

The raft game continues and now at the stop the trainer only asks the participants whose number reflects the rule being applied to transform themselves.
E.g: «Only divisors of 24 transform»
«Only prime number divisors of 24 transform», etc.
Duration - A minimum of 15 minutes.

ADDITION

Key words - Addition, the four operations.
Purpose - Understanding the mechanics of addition.
Pre-requisites - Knowing how to count in the local language.
Didactic materials - Music.
Description - The raft format is used (see previous activities).

Once participants have internalised the mechanics of the raft, when the trainer signals to stop, he/she asks participants to form groups of 2, 3 or 4 people of their choice who are in physical contact with each other (which part of the body can be indicated). At the trainers go (or with the start of the music) the subgroups formed start walking again in the space without losing the contact they have made. At the next stop, the

trainer asks that the subgroups create a larger group that is N people bigger, leaving it up to the participants to figure out what combination of subgroups to use.
E.g: Let's assume the group is made up of 19 participants. At the first stop 6 subgroups are formed of 2, 3, 3, 3, 4 and 4 people.

The subgroups start walking again and at the second stop the trainer asks them to form groups of 10 people. At this point the participants can decide to link up the 2, 4 and 4 groups or the 3, 3 and 4 ones.
After having made sure that the operation is correct, the participants break contact and start walking alone again in the space ready for a new round.
Duration - About 30 minutes.
Variations - When participants are confident with the workings of the game, they can be asked to form subgroups and the final group without speaking.
Observations - This activity works well if the group is comfortable with physical contact.

SUBTRACTION

Keywords - Subtraction, the four operations.
Purpose - Understanding the mechanics of subtraction.
Pre-requisites - Knowing how to count in the local language.
Didactic materials - Music.
Description - The space is divided between the stage and the audience. The trainer subdivides the group into subgroups according to the operations to be demonstrated.

To describe the exercise we will take the example of "6-4".

In subtraction the 6 represents the minuend and the 4 is the subtrahend.

The trainer creates a subgroup made up of 10 elements. The minuend is represented by 6 components. The subtrahend consists of the remaining 4 people.

The group that represents the minuend builds a static scene by simply going onto the stage with all the participants remaining immobile and making contact with each other.

Once the static scene is put together the trainer starts some music. With the music the first component of the subtrahend enters the scene with an amusing walk and moves toward the minuend static scene touching one component of the minuend with a hand. The person selected has to imitate the walk following the person who chose them in a sort of procession and then head off the stage. The same will happen with the other three members of the subtrahend; each one entering with a unique walk that is different than the previous one.
At the end of the sequence, the difference remains on the stage which, in this case, is 2.
Duration - About 30 minutes.
Variations - An interesting variant to try at another moment could be doing an operation where the minuend is smaller than the subtrahend to demonstrate that it is not possible to carry out with absolute numbers or to illustrate the need for relative numbers.
Observations - This activity works well if the group is comfortable with physical contact and the participants have already overcome the embarrassment of exhibiting themselves in front of their classmates.

MULTIPLICATION

Keywords - Multiplication, the four operations.
Purpose - Understanding the mechanics of multiplication.
Pre-requisites - Knowing how to count in the host language.
Didactic materials - Music.
Description - The space is divided between the stage and the audience. The trainer subdivides the group into subgroups according to the operations to be illustrated.

To describe the exercise we will take the example of "5 x 3". In multiplication the 5 is the multiplicand and the 3 is the multiplier.

The space is empty and all the participants are outside the work area.

To the music chosen by the trainer, a person enters the scene with a silly walk. Four other participants follow the first one trying to copy the way of walking put forward. In this way there are five people walking in the space together in the same way. To the stop of the music, done by the trainer, the group of 5 creates a sculpture made up of statues that are in contact with each other. The first group has thus completed their task.

At this point the music starts again and a second group of 5 enters with a different type of walk and follows the same sequence as the first group finishing with a sculpture.

The same goes for the third group.

In the end, there will be 3 groups of 5 immobile people so it will be simple for the spectators to count out the results of the multiplication question which is evident by the number of people on the stage.

Duration - About 30 minutes.

Observations - This activity works well if the group is comfortable with physical contact and participants have already overcome the embarrassment of exhibiting themselves in front of their classmates. The choice of appropriate music is also important as well as ensuring that participants exaggerate the silly walk.

DIVISION

Keywords - Division, remainders, numbers.

Purpose - Explaining division and remainders.

Pre-requisites - Knowing how to count.

Description - The trainer delineates a work space which is referred to as a raft. The participants walk within the perimeter of the raft trying to remain evenly distributed within the space. The trainer can guide the participants verbally with a stop and go or with a percussion instrument or piece of music: when the music is playing they walk. When it stops, all the participants make contact with each other forming only one large group. At this point, the trainer asks the participants to divide into N equal groups and improvise being one animal all together. Subdividing into N equal groups is obligatory except for certain people who may be excluded because the total number of participants isn't exactly divisible by N and therefore the division would have a remainder. In the division, the total number of participants is the dividend and N is the divisor. The quotient of the division is the number of people in the subgroups and excludes the subgroup of remainders.

Each group has to use their voices and bodies together to re-create the animal the trainer names. The subgroup of the remainder builds only a part of the animal. Once all of the animals have been formed,

the trainer asks each animal to perform in front of the rest of the group, showing off their way of moving and the sound they can make. After the performance of all the animals the trainer shares the numbers for the division just carried out, with the group: dividend, divisor, quotient and remainder.
E.g: If the group is made up of 20 participants and the trainer asks them to form 4 groups to create a cow, groups of 5 people will be formed and we'll have a herd made up of 4 cows in which 5 is the quotient, 20 the dividend and 4 the divisor; if the trainer asks to form groups of 6, we will have a herd of 6 cows made of 3 people each and a remainder of 2.
Duration - About 30 minutes.
Variations - The same activity can be carried out asking the subgroups to form objects or abstract concepts with their bodies instead of animals. These variations are more complex to achieve, especially the abstract concepts, so it is advisable to propose them to groups with a good capacity for abstraction.

FRACTIONS

Keywords - Fractions.
Purpose - Training participants to recognise simple fractions.
Pre-requisite - Knowing how to count from 1 to 10 in the local language.
Description - The raft format is used (see activity above).

When participants have understood the raft mechanism, at the stop the trainer will ask participants to form groups of N people who will be in contact physically (an indication can be given on which part of the body). When the trainer says go (or the music starts) the subgroups of N people arranged together go back to walking in the space without losing the contact that had been made. At the next stop the trainer will ask a fraction of the participants in each group to portray an object/animal/person.
E.g: Subgroups of 4 people are formed: 1/4 of each group turns into a ball, 2/4 of the group turns into a chicken and 6/8 of the group turns into a book.
Transformed in this manner the groups continue to move in the space without losing contact. At the next stop and go, the groups break up

and the participants go back to moving alone in the space.
Duration - A minimum of 15 minutes.

CALCULATING IN YOUR HEAD

Keywords - Calculating in your head, operations, times tables.
Purpose - Learning how to calculate in your head in a playful way.
Pre-requisites - Knowing how to count, knowing the 4 operations.
Description - It is played in pairs. The trainer delineates an area that serves as a stage for the duel. The two participants go to the centre of the stage back to back like in a western gunfight. When the trainer gives the go-ahead, the two duellers take 3 steps in the opposite direction. At the end of the third step the trainer calls out an operation to be calculated mentally. The duellers can turn around and mimic shooting the adversary only when they can give the answer of the operation assigned by the trainer. The person who "shoots" the correct answer first wins the duel and remains standing while the adversary that has been "hit" falls to the ground and is eliminated. After the elimination a new dueller enters the game.
Duration - About 30 minutes.
Variations - Depending on the level of competitiveness desired in the game, the duelling couples can be changed at each round or the person who gives the correct answer can remain.
Observations - It is important to evaluate whether participants are ready to compete with each other or whether a climate of competition could inhibit those weaker at calculating in their head. To reduce the tension of the competition, it is important that the trainer maintain a playful atmosphere.

The difficulty of the operations proposed should be evaluated to reflect the capacity of the participants.

LEAST COMMON MULTIPLE

Keywords - Least common multiple, prime factors.
Purpose - Understanding the mechanics of least common multiple.
Description - The trainer divides the group into subgroups of 3 or 4 people.

Each subgroup has to stage a holiday that has very specific characteristics. Each participant in the subgroups expresses a desire regarding the vacation that will be represented. For example: at the sea, relaxing or a bike trip in a city full of cultural sites, etc. It's possible that the same desire is expressed by two different people. The subgroup must imagine and stage a vacation that includes all the desires expressed by the individual participants. The piece should be rehearsed before it is performed in front of the others.
Duration - About 30 minutes.
Variations - The metaphor of the vacation can be substituted with other situations that are more appropriate for the group.
Observations - The process of creating the vacation is a metaphor for the mechanism of calculating the least common multiple: all the common and non-common desires (prime factors) of the participants (numbers) are collected. In this exercise the exponent is not considered but through the tests carried out with groups it emerged that the abstraction presented is adequate to understand the heart of the concept of the least common multiple. The exponent can be introduced subsequently during a frontal lesson. In order for the activity to function, it is important that the group have the capacity to work together and theatrically depict a situation.

GREATEST COMMON DIVISOR

Keywords - Greatest common divisor, prime factors.
Purpose - Understanding the mechanics of greatest common divisor.
Description - The trainer divides the group into subgroups of 3 or 4 people.

Each subgroup has to stage a vacation with precise characteristics. Every participant in the subgroups expresses 5 desires for the vacation that will be represented. For example: at the sea, relaxing, biking, abroad, reading a lot or biking in a city full of cultural sites, etc. The subgroup must imagine and stage a vacation that only includes the desires expressed in common by all the members of the group. The piece should be rehearsed before it is performed in front of the others.
Duration - About 30 minutes.
Observations - The process of creating the vacation is a metaphor for

the mechanism of calculating the greatest common divisor: only the common desires (prime factors) are considered of all the participants (numbers). In this exercise the exponent is not considered but through the tests carried out with groups it emerged that the abstraction presented is adequate to understand the heart of the concept of the greatest common divisor. The exponent can be introduced subsequently during a frontal lesson.

In order for the activity to function, it is important that the group have the capacity to work together and theatrically depict a situation.

4.3 - Geometry

PLANE GEOMETRY

Keywords - Geometry.
Purpose - Introducing elements of plane geometry.
Didactic materials - A 100 - 120 cm stick for each participant.
Description - The trainer shows the group how to use the stick in a theatre battle. There are three possible types of attacks:

- An attack from above to below on the head;
- A horizontal attack at neck/shoulder height;
- A diagonal lateral attack downward towards the legs.

Each attack has a corresponding defence.

Participants practice in pairs, to understand and render the six attacks and defences spontaneous.

Once they are comfortable with the sticks, the participants are divided in pairs and invent a story which includes a battle that involves a sequence of attacks and defences which is developed into their own sequential story.

Within the sequence of the battle the pair must insert three immobile moments in the scene during which the sticks represent recognised geometrical forms. (e.g. two parallel lines, acute angles, etc.)

The battles are performed one at a time to the rest of the group.
Duration - A minimum of 45 minutes.
Variations - The geometric forms represented can be indicated by the trainer or the combatants. In the second instance, an interesting take

would be to ask the group to guess the forms being represented during the immobile moment of the scene.

Instead of using a battle with the sticks, participants can be asked to invent a story in which the sticks are creatively transformed into something different than what they are. As in the case of the battles, the story will have moments of immobility in the scene, where it is possible to identify geometric forms from the sticks.

PERIMETER AND AREA

Keywords - Plane forms, perimeters and areas.
Didactic materials - Masking tape.
Description - The trainer traces large geometric shapes on the ground with the sides being at least 2-metres long. The number of shapes has to be high enough that the total number of sides is greater or equal to half of the participants.
E.g. - 20 participants need at least 10 sides: 1 square and 2 triangles.
The trainer can use music to make the activity more lively. Half the group observes and is the audience. The other half of the participants involved, with the go-ahead of the trainer, begin to move within the space walking along the sides/lengths of the shapes traced on the floor. At the trainer's signal, the participants will transform their walk according to their position.
E.g: *«Those on a base turn into an elderly person»*
«Those on a height turn into a chicken»
«Those on a hypotenuse turn into an airplane»

The trainer calls out a stop during which the participants remain immobile and at which point the trainer, with the help of the audience, determines whether the walk exhibited is appropriate for the side on which the participant is standing.

Once there is a basic understanding of the process, it is possible to ask the participants to show the sequences of walks along the shape as they follow the parts needed to calculate the perimeter or the area.

The nature of the types of walks can be emphasised by a context (era, cinematographic style, etc.) and by music chosen by the participants.

In the second phase, it is important to leave the participants enough time to prepare their performance which will subsequently be shown to the public.

Duration - A minimum of 45 minutes.

SOLID GEOMETRY

Keywords - Geometry.
Purpose - Understanding the spatial concept of three-dimensional shapes.
Didactic materials - A pair of white gloves for each participant, music.
Description - The participants are divided into subgroups of 4 to 5 people and each person wears a pair of white gloves. Each subgroup will have to build a three-dimensional geometric shape within the space. The shape will be built in the space highlighting the vertex of the shape itself, represented by the hands in white gloves in a fist.

Building the shape becomes theatrical and each group has to choose a context linked to an era (e.g. ancient Rome, the far west, ancient Egypt...) or a narrative style (e.g. Shakespeare, Tarantino, a soap opera...) and a song that will serve as the soundtrack.

Each subgroup has half an hour to decide which shape to represent and with which style of music.

The portrayal of a subgroup begins with an empty space and the other participants form the audience.

The actors enter the scene one at a time with a walk that is appropriate for the music and setting, and take their positions in the space highlighting the vertices with their white gloves as they construct it.
Duration - A minimum of 45 minutes.
Variations - The construction of the shape can become the narrative of an actual short story.

CARTESIAN PLANES

Keywords - Cartesian plane, coordinates.
Purpose - Understanding the Cartesian plane.
Didactic materials - Masking tape, felt pen.
Description - Using masking tape, the trainer delineates a large Cartesian plane on the floor (if possible at least 4m x 4m). The "X" axis and the "Y" axis are indicated and the positive and negative direction of each.

If the floor is tiled, the single tile will become a unit of measure of the

Cartesian plane. If there are no tiles, regular intervals are marked on the tape illustrating one unit to the next.

Four pairs participate in each session. The rest of the group is the public.

Each pair represents the coordinates (X,Y) of a point on the Cartesian plane. The trainer extracts four pieces of paper, prepared previously, where the coordinates that will be the departure points for the pairs are written. The 4 points are selected in order that a point is in each of the four quadrants so that all the possible combinations of positive and negative coordinates are possible: (+,+), (+,-), (-,+), (-,-) (For example: (3, 2), (5, -3), (-1, 3), (-2, -4)). Each pair arranges themselves on the Cartesian plane deciding which of the two represents X and which Y. Depending on the sign of their coordinate, each participant will reflect a positive or negative state of mind.

When all the pairs are on the Cartesian plane, and have understood their state of mind, the real action begins. The trainer announces the improvisation that the pairs will do. One at a time, they will have to improvise the theme given with a story of at least a couple of minutes. The characters involved will have to improvise keeping faith to their state of mind which reflects their position on the Cartesian plane (positive or negative).

Duration - A minimum of 45 minutes.

Variations - The pairs may be asked to improvise the same story in 4 different versions or be given the freedom to improvise 4 different stories.

Observations - It is important that the group has already tried theatre improvisation before doing an activity like this. Without the basics the difficulty of improvisation may prove to be frustrating for the participants.

EXPRESSING DEFINITIONS AND THEOREMS

Keywords - Geometry, algebra.

Purpose - Improving the capacity to express a definition, theorem, etc.

Didactic materials - A 2m x 2m black cloth.

Description - Participants are divided into pairs. Each couple selects what they want to express from definitions, theorems, axioms, etc.

To express their own concept, one person may use their hands and the other words. One of the pair is sitting in a chair while the other is kneeling behind the partner and passes her/his arms under the underarms of the person sitting. The person seated puts her/his arms behind the back of their partner.

Brought together in this way, the two components will be able to "speak" helping each other: the seated one can talk, the kneeling one can move her/his arms and gesticulate in sync with the words said by the partner. To render the situation more effective it is important to cover the body of the seated person with the cloth so the arms of the kneeling person stick out of it. The kneeling person must also hide their head from the public lowering it behind the back of the seated partner.

Each pair has 10 minutes to decide which concept to express to the public, assign the roles within the pair and decide how to coordinate the voice of one and the gestures of the other during the presentation.

The trainer explains the context within which the action will take place to the group: we are at an international conference and finally, after waiting for many years, a secret will finally be revealed that will revolutionise the state of modern mathematics.

Each pair presents their concept, the trainer plays the presenter and the group is the public at the above-mentioned conference.

Duration - A minimum of 45 minutes.

Observations - The role of the presenter played by the trainer is very important in this case. Making the conference situation theatrical will foster the public's and orators' enjoyment.

SEXAGESIMAL SYSTEM

Keywords - The clock, seconds, minutes, hours, angles, minutes, seconds.

Purpose - Understanding the relationship between seconds, minutes, hours and sexagesimal measurements in general.

Didactic materials - Music.

Description - The trainer divides the participants into groups of three.

The members of the groups represent the three components: seconds, minutes and hours, respectively.

The trainer asks the participants to develop a performance, choosing

a context, music, the characters and deciding the nature of the relationships.

The performance is made up of actions that are carried out according to a very precise sequence, like the hands of a clock.

It is critical that the trainer clarify the interdependence between the hours, minutes and seconds and explain that, not being able to respect the timing of a real clock (that is waiting 60 seconds for the minutes to move and 60 minutes for the hours to move), the representation is a metaphor which demonstrates the relation between seconds, minutes and hours and units in general with submultiples in sixtieths (degrees, minutes and seconds).

Being able to represent the clock on 3 concentric circles may be helpful to the participants so they have a clear spatial disposition which helps understand the phases: when the seconds character has completed a cycle the minutes one can start and so on.

The trainer gives the group a pre-established time to create the performance. Each group exhibits a complete cycle of their clock to their classmates.

Each performance must respect three rules: having a clear beginning, a performance section and an exit scene.

The three characters enter the stage one at a time taking their positions in the space and remain immobile. When everyone is ready on the set, the clock starts working and it stops after having completed at least one complete cycle.

Duration - A minimum of 30 minutes.

UNITS OF MEASUREMENT

Keywords - Numbers, units of measurement.

Purpose - Becoming familiar with the basic units of measurement (litres, grams, metres).

Didactic materials - Music.

Description - The trainer divides the participants into subgroups of 5 to 6 people.

Each group is assigned a time (at least 20 minutes) to prepare their own performance which will be shown to the rest of the group.

Each subgroup has to present a recipe the ingredients of which the

individual participants represent. Each ingredient has its own way of moving and its own character. For example, coffee could have a fluid and anxious way of moving, butter slow and heavy, etc. Each group selects its own presenter.

The space is divided into stage and public. The stage is used in a circular manner as if it were a circus stage. During the performance, which is conducted with pre-selected music, the ingredients enter one at a time, introduced by the presenter as if they were artists in a circus, and they arrange themselves on the stage. Subsequently, when all the ingredients are lined up in front of the public, the presenter begins to recite the recipe, asking each ingredient a precise quantity, specifying the unit of measurement. When the ingredients are called out by the presenter they begin to mix with each other and transform themselves as if they were subject to heat, mixed, etc., until they arrive at the final product.

Duration - A minimum of 45 minutes.

Variations - Alternatively to the preparation of a recipe, the group could be asked to stage building something that is made up of several parts that are clearly identified by units of measure. For example, building a piece of furniture from Ikea in which case the presenter will read the building instructions instead of the recipe. Otherwise they may build a famous monument (e.g. the Statue of Liberty).

Observations - It is important to emphasise the circus-like dimension to render representing the ingredients and creating the recipe pleasurable and easy. In this sense, the choice of music which accompanies the actions is very important and the trainer can recommend music to the group that is appropriate for their aim.

4.4 - Literal calculation

REPRESENTING MONOMIALS AND POLYNOMIALS

Keywords - Literal calculation, monomials, polynomials.

Purpose - Understanding representations of monomials and polynomials.

Didactic materials - A pack of A4 paper, large-tipped felt pens, two different-coloured tunics, music.

Description - All the participants will turn into monomials that exhibit themselves in a parade.

The transformation into a monomial follows very precise rules that are useful for understanding the concept of monomials itself, which the trainer must introduce:

- each person represents a letter or a number;
- the coloured tunics represent a letter (e.g. yellow is X, orange is Y)
- the coefficient is written on a sheet of A4 paper and held in the hand of a letter at stomach height;
- the exponent (from 2 to 5) is represented by the left hand raised above the head;
- the +/- sign isn't written on a sheet of paper, if it is positive the person is facing the public, if it is negative the person has their back to the public.

The participants decide which monomial they want to be and consequently whether they will work alone or in a pair.

E.g: $3X^2$ - one person,

$3X^2Y^3$ - two people.

Once the participants have decided which monomial to represent, the trainer subdivides the space into two areas: the public and the runway.

Half the group is the audience, the other half goes onto the stage for the runway show and at the end of the parade the two groups invert their roles.

The runway show foresees the use of music and the presence of a presenter (the trainer or a participant who is particularly able to improvise describing the models while they strut).

Like in a real fashion show, the monomials present themselves on the runway one at a time, each with their own way of walking. They stroll down the runway to show themselves off with dynamism to the public. The presenter describes the models on the runway in an amusing manner.

Duration - A minimum of 45 minutes.

Variation - The same structure can be used for presenting simple polynomials.

Observations - The role of the presenter played by the trainer is very important in this case. Making the fashion show situation theatrical will foster the public's and models' enjoyment.

OPERATIONS BETWEEN MONOMIALS

Keywords - Literal calculation, monomials, polynomials, operations between monomials and polynomials.
Purpose - Understanding the representation of monomials and polynomials.
Didactic materials - A pack of A4 paper, large-tipped felt pens, two different-coloured tunics, music.
Description - The trainer divides the groups into subgroups of 3 to 5 people depending on the requirements.

Each subgroup decides which operation among two monomials to represent.

Participants turn into monomials according to the rules described in the activity "Representing monomials and polynomials".

Once it has been decided which operation to represent (e.g. 3X + 4 + 2X) and the passages to arrive at the solution understood, each subgroup decides its context (historic era, film genre, etc.) and selects a soundtrack.

Each subgroup stages the operation selected, characterising it starting with the setting and the soundtrack, to arrive at the solution. The theatrics call for a silent scene in which each monomial is personified by its own way of moving and reacting. With the encounter of the two monomials, the execution of the operation takes place.

The trainer divides the space into two areas: stage and audience. Each group presents their own operation to their classmates.
Duration - A minimum of 1 hour.
Variations - The same structure can be used to represent products.

EQUATIONS

Keywords - Literal calculation, monomials, polynomials, operations between monomials and polynomials, equations.
Purpose - Understanding the resolution of first order equations.
Pre-requisites - Knowing operations between monomials.
Didactic materials - A pack of A4 paper, large-tipped felt pens, two different-coloured tunics, music.

Description - The trainer divides the group into subgroups composed of an appropriate number of people according to the requirements described as follows.

Each subgroup decides which first order equation to resolve. It would be interesting to have at least two monomials with the letter X and two numbers. (E.g. $3X + 2 = - 4X + 3$).

The participants turn into monomials and numbers according to the rules described in the activity "Representing monomials and polynomials".

Regarding the simple representation of monomials and polynomials, in the event that an equation have the symbol = introduced, it is represented by a participant with a sheet of paper upon which a large equal sign is drawn.

Once the equation to represent has been decided, the group solves it on a sheet of paper to understand the passages to arrive at the final answer $X = n$.

Each group decides upon a setting (historic era, film genre, etc) and a soundtrack.

The solution to the equation is staged and characterised by the setting and the soundtrack. The theatrics call for a silent scene in which each participant is characterised by their way of moving and reacting and the operation takes place as described in the "Operations between monomials" activity.

During the performance it is crucial that the passages in an operation are done one at a time and very clearly in order to allow the public to read what is happening in the scene from both a theatrical and mathematical point of view.

In this sense the person who plays the equal sign plays a fundamental role. He/she has the role of controlling the traffic of whom in the equation moves from right to left of the equal or vice versa, making sure the signs are changed.

The trainer gives each group approximately 30 minutes to prepare the theatre sketch. Each sketch is presented to the rest of the group which plays the audience and must make sure that the steps are carried out correctly.

Duration - A minimum of 1 hour.

Observations - During the presentation phase it is important that the

participants have fun staging the equation. It is not essential that all the steps be carried out correctly. An error in resolving it can become a starting point for reflection by the group to reason together on the rules of equations and make them their own.